Washington State Department of Transportation

Server Consolidation at HQ IT Operations Center

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Server Virtualization

The WSDOT Office of Information Technology has utilized server virtualization technologies since 2004, using the VMWare ESX platform in a High-Availability cluster configuration.

- Today, 36% of the ~550 servers that OIT manages at the WSDOT HQ IT Operations Center run as virtualized instances.
- By the end of 2010, that percentage will be 50% or higher. A recent acquisition of new virtual host hardware will enable us to meet and well exceed that target.
- In the last two years the physical footprint of the IT equipment in the ITOC has shrank to 49% of the total raised floor space (6,329 sq. ft.). That includes the new, smaller mainframe tape library / Virtual Tape Library (VTL), and shrinking from 54 server racks to 36. The trend will continue for servers as we virtualize more qualifying systems. That reduction in space was a significant factor in the implementation of the new WSDOT Emergency Operations Center in 2008.
- OIT has realized significant cost avoidance in server hardware lifecycle replacement, power and cooling requirements as a result of server virtualization. We are currently seeing a density of better than 20:1, which will continue to increase with advancements in virtualization software / hardware.
- WSDOT uses the VMWare ESX software platform for server virtualization, which offers industry-leading high-availability and performance capabilities. This spring, WSDOT is moving to a new VM cluster running VMWare's newest V-sphere / ESX 4.0 platform. This, coupled with new features built into the Intel Xeon "Nehalem" CPU, will further drive up virtual server density. And more importantly, it opens up new opportunities to virtualize server workloads not previously suitable for a virtual environment.

HQ ITOC Virtual Server Infrastructure

At a Glance:

6-node VMWare 3.5 ESX HA cluster

- HP DL585 G2 and Dell PowerEdge 6950 servers
- 48GB RAM ea.

Cisco / IBM Fibre Channel Storage Area Network (SAN)

- Cisco MDS 9600 4GB fabric
- IBM ESS storage device

New VMWare HA cluster (Spring 2010)

- 6-node VMWare V-sphere 4.0
- HP DL380 G6 servers
- 72GB RAM ea.
- XioTech Emprise 5000 storage

Blade Servers

The WSDOT Office of Information Technology has implemented blade servers by HP to reduce physical footprint and increase operating efficiency.

- OIT has implemented the HP "C" Series blade enclosures, which allows up to 64 servers per rack and offers "green" technology to better manage power consumption. Previously our best rack density with traditional rack-mounted servers was around 20, because of concerns around heat dissipation and the amount of cabling required. HP's data says that blades "use up to 40% less power and 40% less space when compared to equivalent 1U rack mounted servers."

- Studies (from IDC and others) show that blades tend to have a lower Total Cost of Ownership (TCO) because of their improved operational efficiency and their excellent manageability – faster time to provision and much fewer cables mean less labor cost to manage blades.

- Specifications: 7 HP C7000 Blade Enclosures. Blades: HP DL460G5 and HP DL460G6 blades. Cisco C3020 integrated network switch. 4GB Fibre Channel pass-through modules for SAN connectivity.